

**Table 2. INTERLABORATORY COMPARISON OF
MINNESOTA DEPARTMENT OF HEALTH
SILVER BAY AIR SAMPLES FIBER
ANALYSIS CORRELATION COEFFICIENTS**

	X-ray Diffraction	Mt Sinai	EPA/ERL-D	M D Health	Lab A	Lab B	Lab C
X-ray Diffraction	1.00*	0.83*	0.94*	0.89*	0.06	0.15	0.59
Mt Sinai	0.83*	1.00	0.77*	0.82*	0.18	0.33	0.69
EPA/ERL-D	0.94*	0.77*	1.00	0.93*	0.01	0.15	0.52
M D Health	0.89*	0.82*	0.93*	1.00	0.07	0.05	0.59
Lab A	0.06	0.18	0.01	0.07	1.00	0.43	0.06
Lab B	0.15	0.33	0.15	0.05	0.43	1.00	0.04
Lab C	0.59	0.69	0.52	0.59	0.06	0.04	1.00

* = Significant correlation at 99.5% confidence level.

TEM and XRD Methods Can Be Adapted to Many Types of Samples



A black and white micrograph showing a dense distribution of small, dark, irregularly shaped particles against a light background. The particles vary in size and shape, with some appearing as thin, needle-like structures and others as more rounded, clumpy aggregates. The overall texture is granular and heterogeneous.

Dry cobb tailings $<2\ \mu\text{m}$ fraction

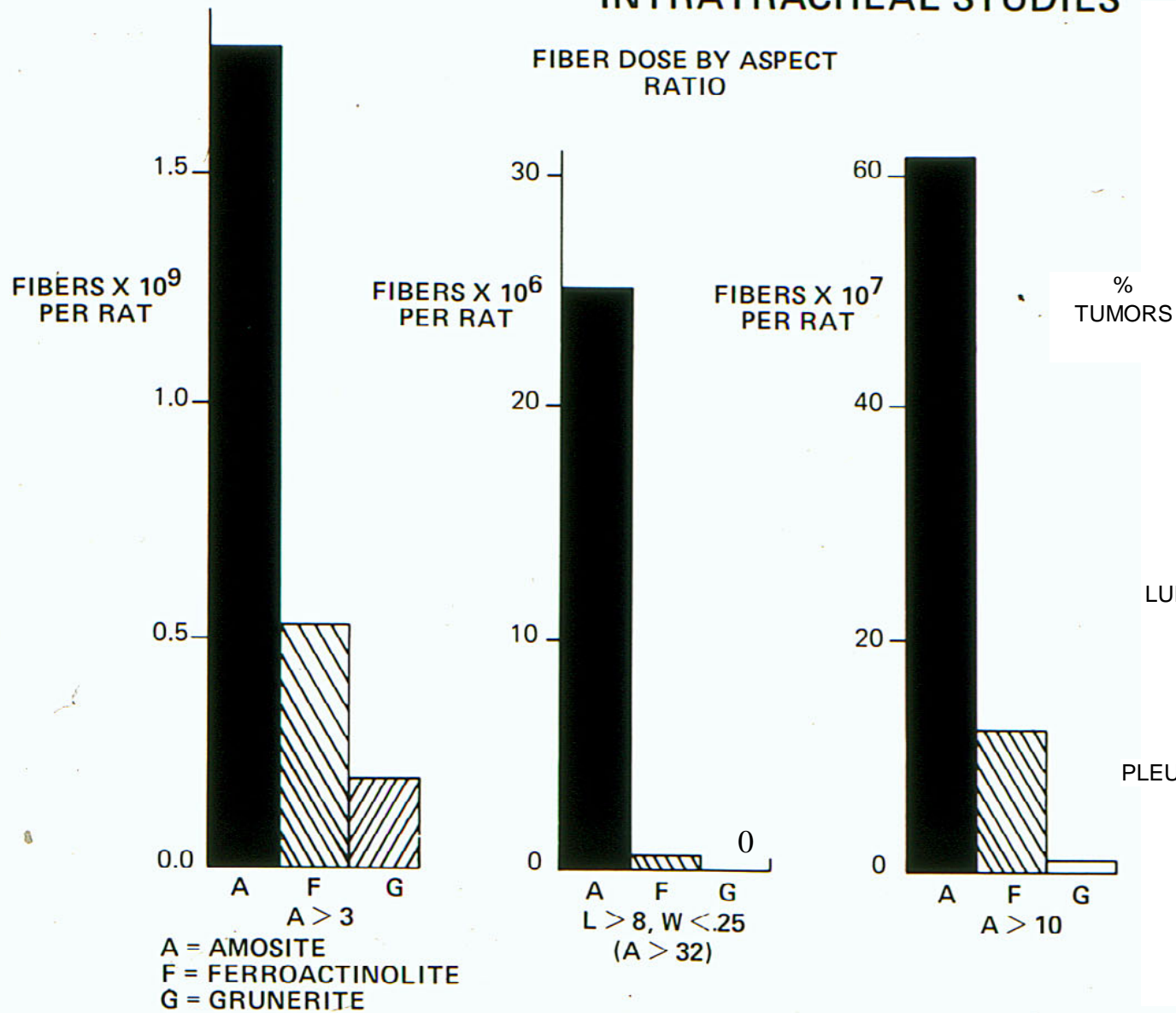
Background

- **Concerns for risks associated with non-occupational exposures to mineral fibers (e.g. Reserve Mining Case), and interest in effects of synthetic fibers led to EPA research on effects associated with a wide variety of durable fibers during the period of 1978-1985.**
- **Determination of carcinogenic potencies relative to known asbestos materials was a major objective.**
- **The EPA laboratory at Duluth provided electron microscopic characterizations of samples used in biological tests, quantitative measurements of fiber doses in test animals, and determinations of dose-response relationships.**
- **This research was revisited this year in response to proposals for use of taconite tailings as aggregate.**

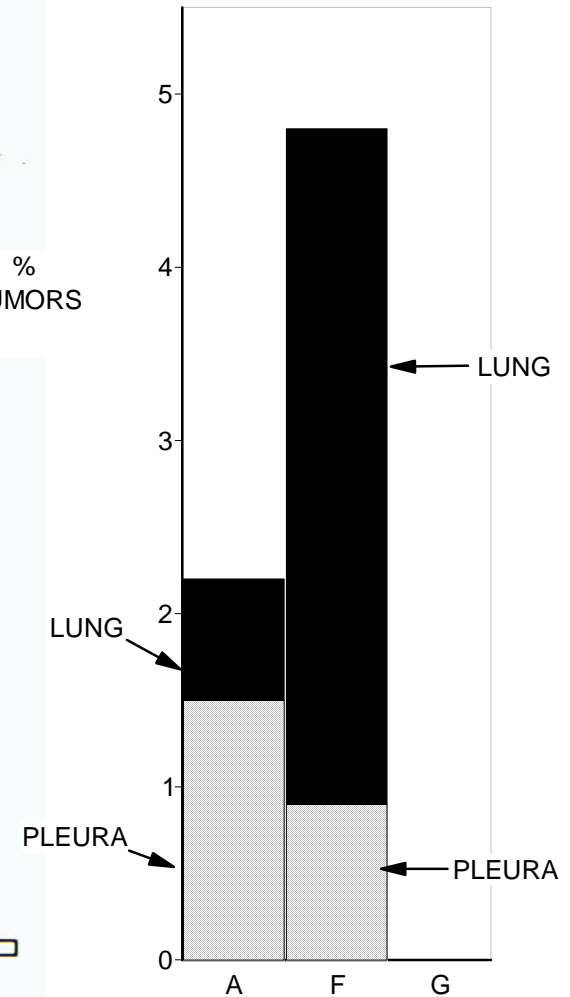
Intratracheal and Intrapleural Exposures of Fischer-344 Rats

- Primary objective was to determine relative potencies of different fiber types for carcinogenesis
- Studies included two samples of amphibole from taconite at Peter Mitchell Pit - ferroactinolite (fibrous) and grunerite (non-fibrous)
- Details of bioassays and effects provided in Coffin et al. *Toxicology Letters*, 1982
- Details of quantitative dose-response analysis provided in Cook et al. *Toxicology Letters*, 1982

INTRATRACHEAL STUDIES



PRIMARY TUMORS



F/A ReP: 7.8

104

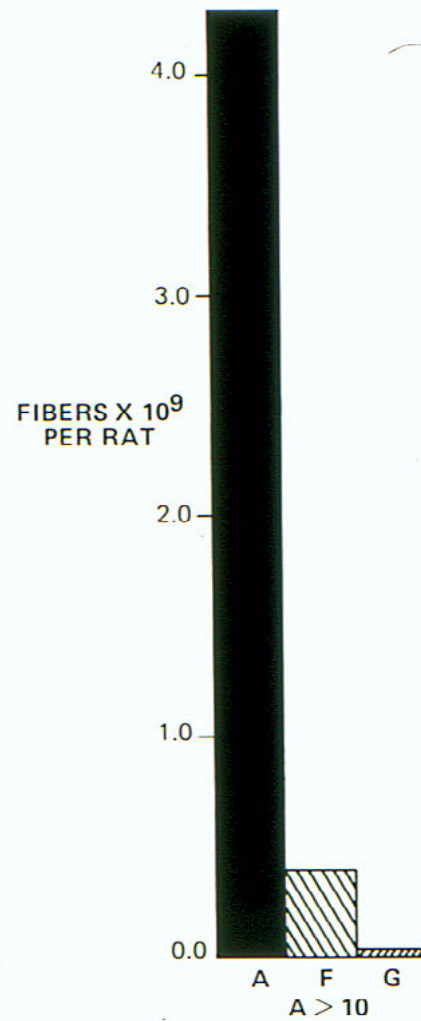
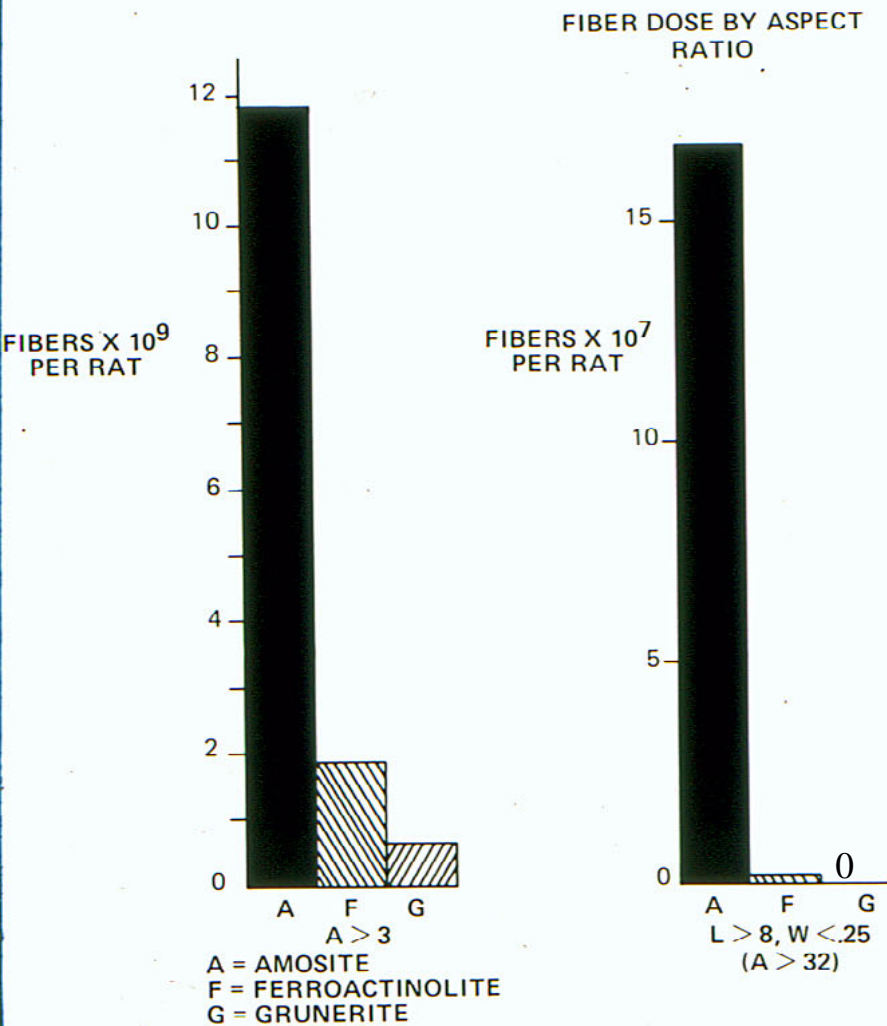
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G/A ReP: <0.7

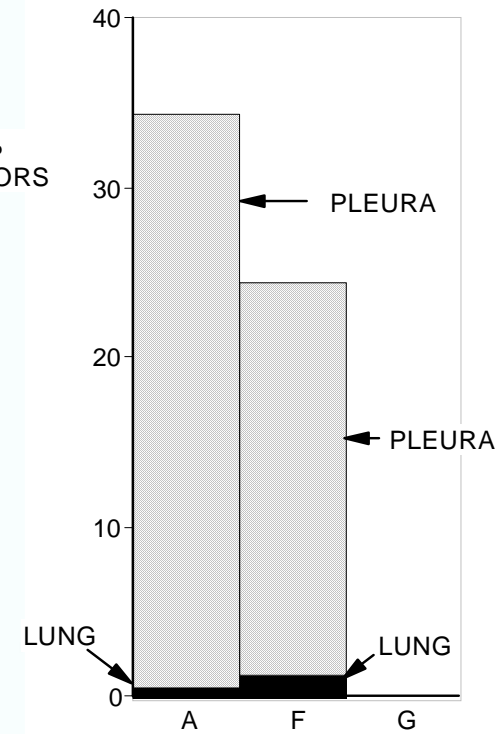
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<2.7

INTRAPLEURAL STUDIES



PRIMARY TUMORS



F/A ReP: 4.7

62

11.6

G/A ReP: <0.3

<70

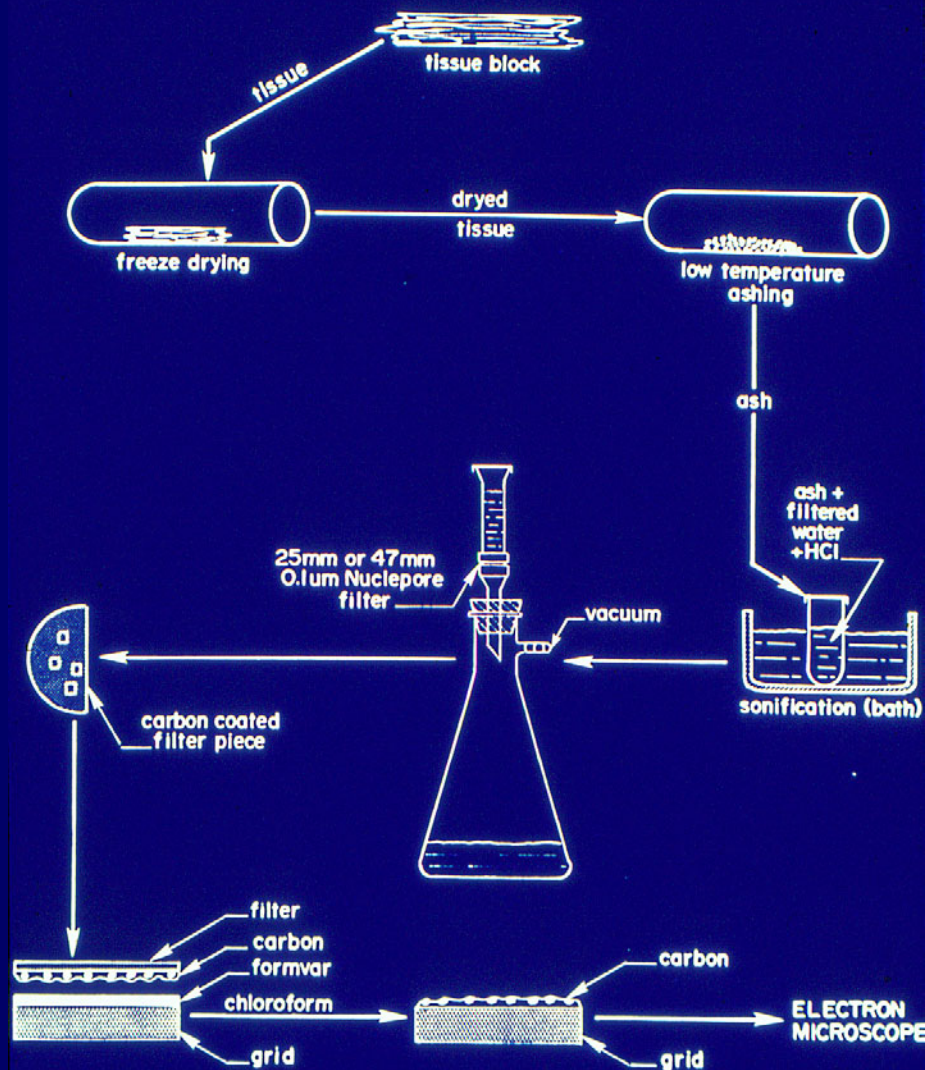
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Why did ferroactinolite appear to be so potent?

Quantitative TEM analyses of whole lung samples from rats over the two year test period provided complete dose characterizations over time.

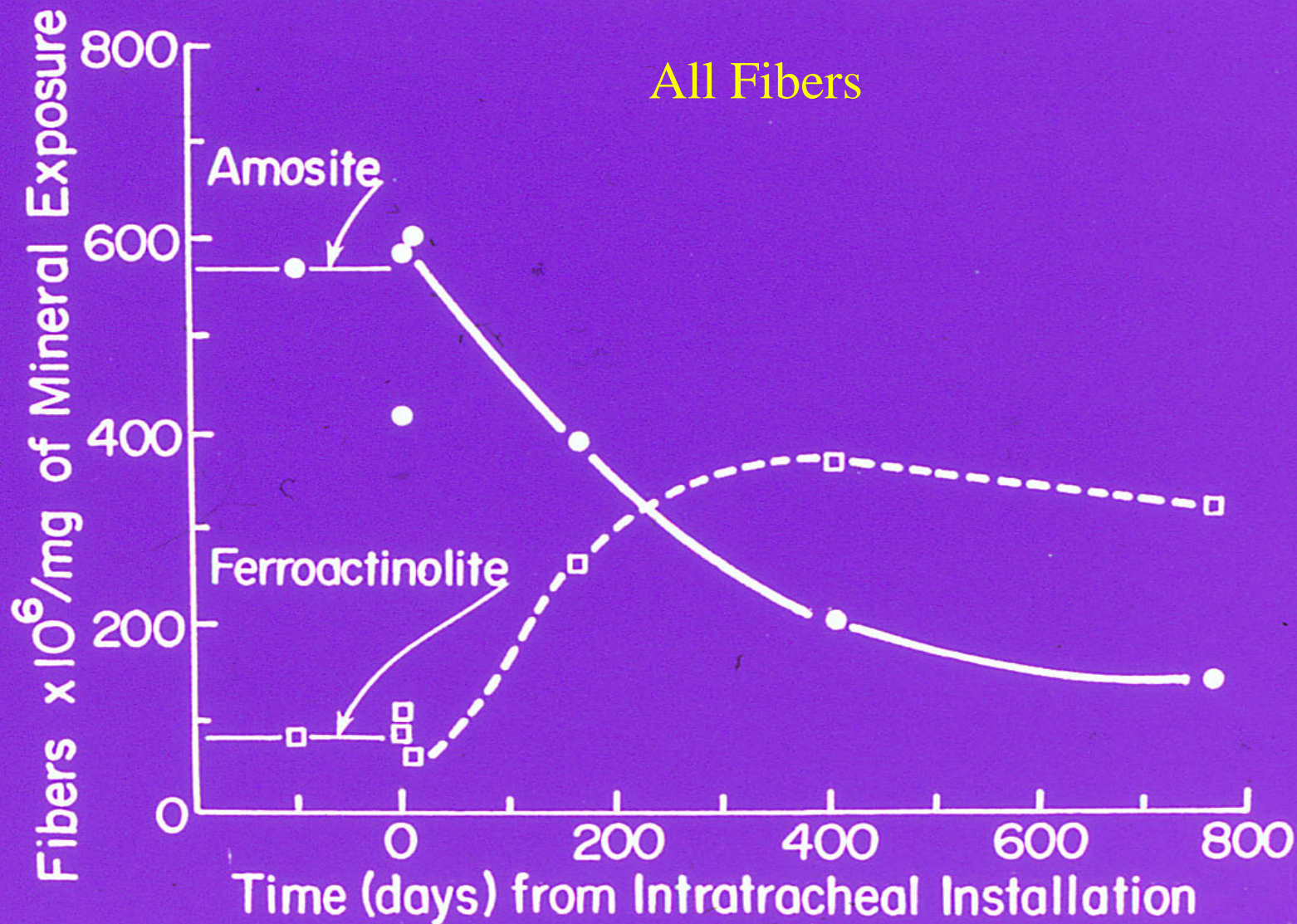
Cook et al. *Toxicology Letters*, 1982

TRANSFER OF TISSUE SAMPLES TO ELECTRON MICROSCOPE GRIDS FOR DETERMINATION OF FINE PARTICLE PRESENCE



Cook, Ann. N.Y. Acad. Sci 1979

RAT LUNGS— RETAINED FIBER CONCENTRATIONS



10^6 Fibers $< 5 \mu\text{m}$ Long and $< 0.1 \mu\text{m}$ Wide/mg
of Mineral Exposure

Short thin fibers

